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THE RELATIVE IMPORTANCE OF HUNTING RESTRICTIONS AND LAND USE IN MAINTAINING WILDLIFE POPULATIONS IN OHIO

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One of the traditional methods of managing our wildlife resources has been to restrict their use by adoption of regulations designed for that purpose. The taking of game, in some places at least, has been regulated since Biblical times (Deuteronomy 22:6). In our own country the game harvest was at first regulated by certain tribal customs which were in effect before the coming of white settlers. As settlement of the country progressed and wildlife appeared to decline in abundance the simple tribal taboos on the taking of wildlife during the reproductive season gave way to more complex restrictions. These we now speak of as the game laws which govern hunting by some 6,000,000 to 10,000,000 persons in the United States each year.

Presumably the complexity and severity of the regulations adopted provide a rough measurement of wildlife abundance in relation to hunting pressure. If this is true it follows that a study of the game laws should provide an index to past and present wildlife abundance and a measure of the effectiveness of regulations in perpetuating the crop. It is the purpose of this paper to set forth the results of such a study in Ohio.

Interest in the study stemmed from several sources as did material upon which it is based. A chapter by Dr. Paul B. Sears (11) in "The History of Ohio" first aroused the writer's interest in the subject. This interest was further heightened by a challenge from Dr. T. H. Langlois (6) to game administrators to demonstrate that the expenditure of large sums of money for law enforcement by the states was productive of results in terms of higher fish and game populations.

Two excellent sources of useful historical data in this field were available for reference. These include a History of Conservation Restrictions in Ohio, by the late Judge C. M. Finfrock (3) and a Summary of Ohio Game Regulations from 1890 to 1930 which was prepared by Mr. E. L. Wickliff, (12). Neither summary has been prepared for publication. Judge Finfrock, authorized the writer to freely use his data (4) and loaned a typewritten copy of the material for this purpose. Mr. Wickliff kindly permitted the writer to use his material for reference.

The principal sources of data presented in this paper in addition to the above references are the Laws of the Northwest Territory which governed the use of wild-

[1]The writer wishes to express appreciation for assistance in the preparation of this paper to Mr. E. L. Wickliff, who helped materially in furnishing records of Ohio game laws and in suggesting sources of information used in compilation of this report. He wishes also to acknowledge the assistance of his colleagues in the Ohio Wildlife Research Unit, Dr. D. L. Leedy and Mr. E. E. Good, who read the manuscript and offered suggestions for its improvement. Particular thanks are due his wife, Christine K. Dambach, for the laborious task she performed in checking dates and length of open seasons presented in Chart 1.

life in Ohio prior to its statehood, the Laws of Ohio passed by the State Legislature, the Orders of the Ohio Conservation Council and later the orders of the Ohio Conservation Commission. The Annual Summary of Fish and Game Laws published by the United State Fish and Wildlife Service was also consulted.

Data from the above sources and from U. S. Census Reports (1, 2) were used in the compilation of a Chronological Record of hunting and trapping restrictions in Ohio (Chart I and Figs. 1, 2, 3, 4), and land use changes which effect wildlife populations (Figs. 5, 6). Although the regulations are believed to be essentially correct as presented, some errors may have occurred in interpreting which of the many laws passed in a single legislative session actually were later enforced.

CHRONOLOGICAL RECORD OF WILDLIFE-USE RESTRICTIONS IN OHIO

Protecting man from wildlife.

Laws regulating the use of Ohio's wildlife resources pre-date its statehood. Before 1800 settlers sought protection of themselves and their property from wild animals by the provision of a bounty to encourage the killing of predatory animals and safeguarded the right of all persons to use fire arms for "killing or destroying any wild animals" (Laws of the Northwest Territory, 1790, 1799). Protecting man and his property from wildlife was the primary objective of nearly all legislation concerning wildlife during the period between 1790 and 1857. Most of the laws passed concerned the payment of bounties to encourage the killing of wolves panthers, hawks, and for one biennium, squirrels. The latter law, promulgated in 1807, made it mandatory that each person subject to payment of a county tax "shall in addition thereto, produce to the clerk of the township in which he may reside, such number of squirrel scalps, as the trustees shall, at their annual meeting apportion, in proportion to their county levies, provided that it does not exceed 100 nor be less than 10" (Ohio Laws, 1807).

A penalty of three cents a scalp for the number not turned in was authorized. Although this law was repealed at the next session of the legislature (Ohio Laws, 1809) it is indicative of the attitude of man toward the fauna of his newly invaded environment. Whether or not he succeeded in subduing wild animals through use of the axe which changed the environment or the use of the gun which the bounty encouraged is an important point to consider in our present efforts to manage wildlife for man's benefit. Several other important points are, however, clear from these early records:

1. Game useful to the early settlers and the resident Indian population was present in sufficient abundance in relation to need that no legal effort was made to conserve the supply.
2. Some species of *forest inhabiting* wildlife were present in such numbers as to destroy mans livestock and crops leading him to seek legislative means of protection. Predatory animals were the chief objective of this action.
3. Game animals and their natural predators were abundant at one and the same time.

Protection of wildlife from man.

Although some bounty laws intended to protect personal property from wildlife damage are still in force, they are now of relatively minor significance compared to laws designed to protect wild animals from destruction by man. The first of the latter laws in Ohio was passed in 1829 to safeguard the fur trade. It provided "that if any person shall, between the first of May and the 15th of October following, kill or destroy any muskrats and be thereof convicted—he shall forfeit and pay one dollar for each muskrat—except—where muskrats are destroying property", (Ohio Laws, 1829.) This law was later amended to further protect the fur trade in the Lake Erie counties by extending the closed season and including also the beaver, marten, mink and otter as species to be protected (Ohio Laws, 1833, 1840, 1843).

Apparently little concern was felt for other fur bearing or game species until about 1857. In that year closed seasons were established to protect the bob-white quail, deer, dove, ducks, flicker, geese, prairie chicken, rabbit, ruffed grouse, wild turkey and woodcock. Complete protection throughout the year was provided for certain songbirds, namely: sparrow, robin, bluebird, martin, thrush, mocking bird, swallow, redbird and catbird. In the immediately succeeding years addi-

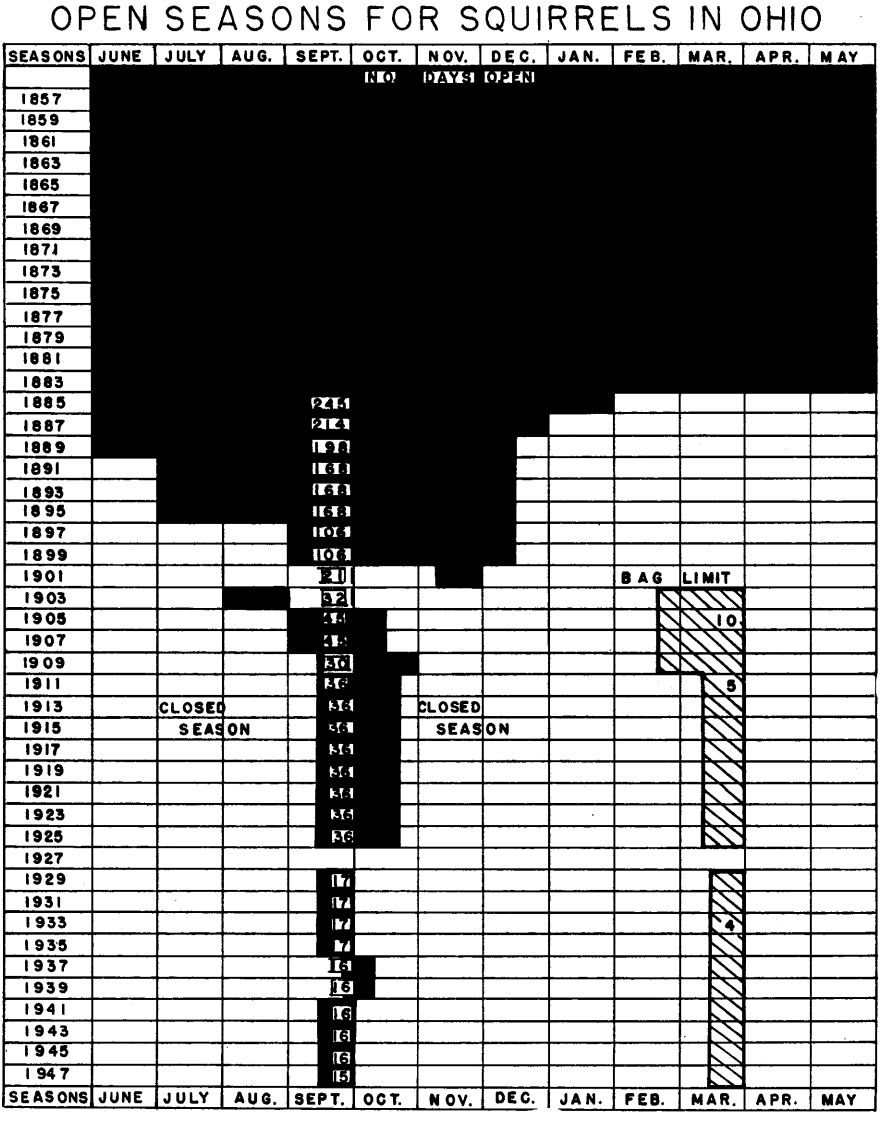

FIG. 1. Open seasons for squirrels in Ohio. Grey and fox squirrels were among the last of Ohio game species to receive the protection of closed seasons. Protection was first given them in 1885 when a 245-day open season was declared. Subsequently the open season was drastically reduced, closed for one year, and augmented by a bag limit which now stands at four per day. This is a marked change from the Ohio law in 1807 which made it mandatory that squirrels be killed.

tional species were given some degree of protection and the closed season was progressively lengthened. (Chart I.)

By 1885 nearly all of our important game and fur bearing species were afforded partial protection and most song and insectivorous birds were completely protected. Providing protection during the breeding season alone was not considered an adequate measure to halt the apparent decline of wildlife in relation to demand. The Legislature early sought other means of coping with the problem. One of these measures was to prohibit all hunting of endangered game species for one or more years in order that they might recover. Hunting of quail, for example, was prohibited in Fulton county for a five year period beginning in 1885. Deer hunting was banned for a four year period beginning in 1896, a ban which subsequently was extended to 1943 when the state had its first legal deer season in nearly fifty years. Similarly, quail and doves were given a rest period in 1913 but later, apparently because they did not respond to protection they were classed as song birds thus removing them from consideration as game species.

The addition of a bag limit to the complex of wildlife use restrictions in 1902 is indication that the legislators were thinking of an equitable distribution of the game crop as well as safeguarding the species. Bag limits like open seasons however became progressively smaller in succeeding years. They were augmented from time to time by new regulations designed to limit the method by which animals could be taken, to limit the number held in possession, to prohibit the sale of wild animals and still more recently to limit the hours of the day during which they can be taken. A few examples of these measures are the outlawing of the use of ferrets in hunting rabbits, the three shell limit in hunting waterfowl, prohibiting baiting and use of live decoys in waterfowl hunting, delaying hunting on the opening day of the season until noon and the most recent restriction in Ohio of limiting hunting to the hours between 9:00 a.m. and 4:00 p.m..

Development of public interest in wildlife conservation.

More than 85 years elapsed between the time the first laws affecting wildlife were passed in the state and the appointment of an official body to enforce them. During this interim game laws were enforced, if at all, by local officials. One of the earliest enforcement problems dealt with the rights of landowners to hunt without restriction upon their own property. This right was upheld by law for rabbits and doves up to 1865 and for rabbits only until 1874. Although the right to regulate the use of resident wildlife on all lands is now clearly vested in the state (Ohio Laws, 1919) there is still evidence of non-compliance particularly in remote areas.

The first official body in the state to deal with these and other wildlife conservation matters was a three-man Ohio Fish Commission created by an act of the Legislature in 1873. Its duties were largely concerned with investigation and recommendation. A new five-member commission, called the Commission of Fish and Game, was appointed in 1886. The law establishing the new commission provided among other things that: the Governor by and with the consent of the Senate shall appoint five Commissioners of Fish and Game, of whom no more than three shall belong to the same political party, one for one, one for two, one for three years and so on and who shall be subject to removal at the governor's pleasure. It further provided for the appointment of fish and game wardens to enforce the fish and game laws. These wardens were to be appointed from the political party polling the most votes in the previous gubernatorial election.

New commissions were subsequently appointed under the terms of this act until 1913 when the Legislature replaced it with a Fish and Game Division within the State Board of Agriculture. A seven-member Advisory Board was appointed in 1923 to assist the new Division in developing a policy and a program of action. Another major change took place in 1929 when the Legislature abolished the Division of Fish and Game and created a Division of Conservation headed by a

commissioner who was appointed by the State Director of Agriculture. A council of 8 members appointed by the Governor for four year terms was established to guide the program of the new Division. Ten years later the present Division of Conservation and Natural Resources was established by legislative action. A nine-member commission appointed by the Governor employs a commissioner who is charged with responsibility for carrying out the program and policies deter-

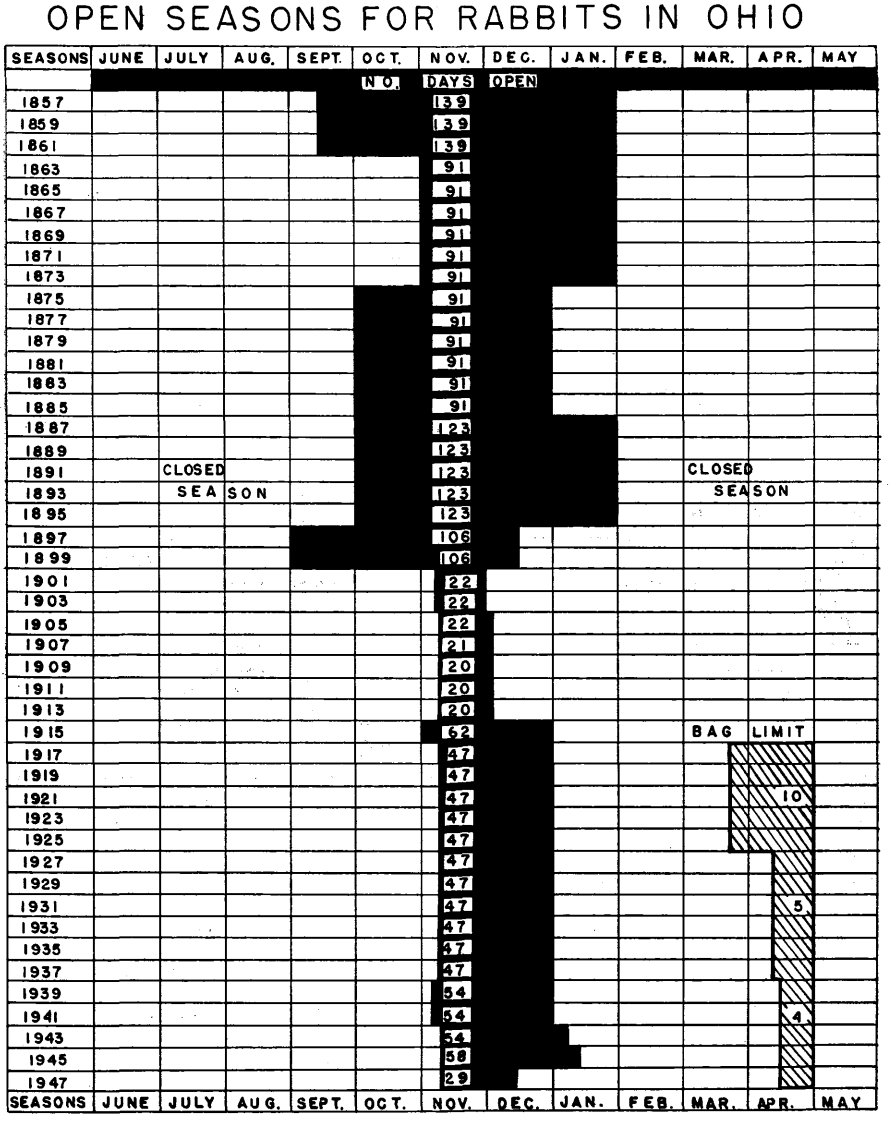

FIG. 2. Open seasons for rabbits in Ohio. Cottontails have been protected by closed seasons in Ohio since 1857 and by a bag limit since 1917. It is of especial interest to note that the shortest seasons in the State's history occurred at the turn of the century when urban population was greatly increasing and when woodland area on farms was rapidly being depleted.

mined by the commission. The commission is bi-partisan, composing not more than four members of the same political party. The ninth member, the State Director of Agriculture, serves on the commission but has no vote in matters concerning personnel. Terms of the commission members who serve for eight years are staggered so that it is unlikely that any one governor may appoint a majority of its members.

The over-all objective of these changes has been to broaden the responsibilities of the state with respect to its wildlife resources and to make more effective its law enforcement efforts. Both the Conservation Commission and the former Conservation Council were vested with authority to issue and enforce fish and game regulations (Section 1390, General Code of Ohio). The present Commission thus is directly charged with responsibility for providing that the wildlife crop is equitably harvested and that it is perpetuated.

Effectiveness of Game Laws in Perpetuating Wildlife Resources.

The majority of the personnel hired by the various conservation commissions in Ohio as in other states have been used to enforce regulations passed by the Legislature or by Commission Order. The effectiveness of these regulations is considered in the sections to follow:

Forest Wildlife

The principal forest game species in Ohio were the Virginia white-tailed deer (*Odocoileus virginianus virginianus*), the grey squirrel (*Sciurus carolinensis*), the eastern ruffed grouse (*Bonasa u. umbellus*) and the eastern turkey (*Meleagris gallopavo silvestris*). All of these species were reputed to have been very abundant in the State at one time. Except for the grey squirrel they have all been protected by progressively longer closed seasons since 1857 and in more recent years by bag limits (Chart I). It is significant that both the white-tailed deer and the wild turkey were extirpated from the State despite the protection afforded them and that extirpation resulted 9 to 15 years after they were supposed to be protected by complete closed seasons.

Squirrels which in 1807 had to be killed to avoid a tax penalty were not given any protection until 1885. The precipitous rate at which the open season was shortened thereafter and the enforcement of a strict bag limit apparently did not halt the decline of these animals (Fig. 1). Similar trends were experienced for other forest game species such as the raccoon (*Procyon lotor*).

The rapid decline of forest wildlife species was in proportion to the decline in total forest area and woodland area per farm and inverse to the rise of human population in the state. (Figs. 5 and 6.) The rate of decline however apparently slackened or was arrested before the rise of the heavy gun-pressure which now characterizes our hunting seasons. This is evident from the fact that open seasons on present forest wildlife have been somewhat relaxed during the past decade. Two species, for example, the ruffed grouse and the now reintroduced white-tailed deer are increasing in number and a third, squirrels, are apparently at least holding their own.

The most logical explanation for this phenomenon is to be found in the amount of land in the state abandoned, in recent years, for agricultural use and in various stages of forest succession. Leedy (8), in a companion paper has pointed out that during the "first 40 years of the present century the number of farms in the southeastern third of Ohio dropped from 86,759 to 73,073 and the land in farms from 8,148,134 to 6,949,919 acres". Most of this land is at present in a stage of plant succession more favorable to deer than the original unbroken forest. As the succession moves on to more mature forest conditions for grouse and squirrels should improve.

Fur bearing animals.

Interest in the welfare of fur bearing animals, other than the beaver, marten, mink, muskrat and otter was not reflected in hunting restrictions until after 1900. Restrictions on the forest inhabiting raccoon as on the squirrel rapidly became more severe soon after their introduction while those on the more adaptable foxes fluctuated greatly from season to season in probable response to competitive lobbying by farm and fox hunter interests. Both grey and red foxes markedly

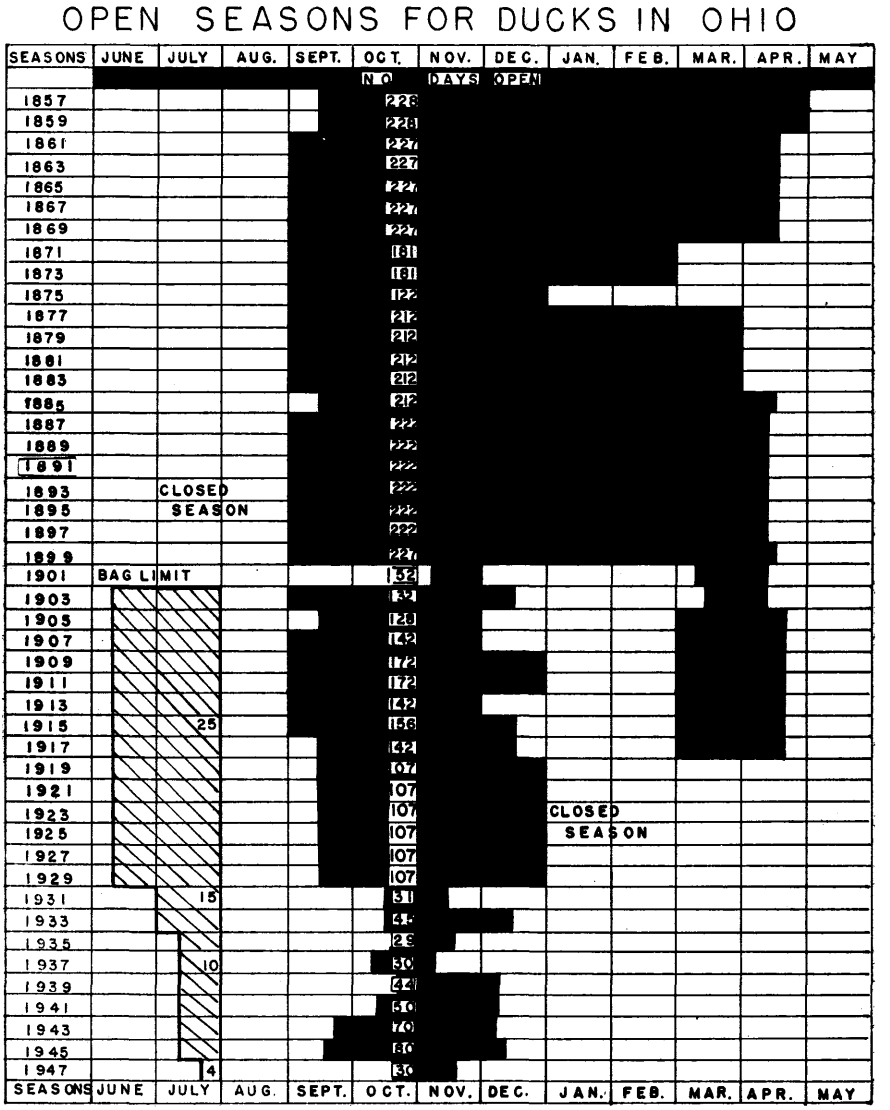

FIG. 3. Open seasons for ducks in Ohio. Restrictions on waterfowl hunting have varied greatly since they were first established in 1857. The lowest ebb in the waterfowl population occurred during the early 1930's when the season was reduced to 30 days. It was subsequently raised in response to improved reproductive conditions despite constantly rising gun pressure. The season has again been drastically lowered because of poor reproduction and a great postwar increase in hunting pressure.

increased in recent years despite the removal of the closed season protecting them and the enactment of a bounty law in 1945 to encourage their slaughter. They have decreased sharply however since 1946.

The trend of restrictions applied to muskrats is a remarkable indicator of population changes in response to environmental alterations. (Fig. 4). This was the first animal to be afforded the protection of a closed season in the state. In some counties where it is now wild-trapped on a commercial scale (Huron, Lucas, Ottawa and Sandusky counties) the trapping season was reduced to but 60 days in 1840 or approximately one-half the present open season in the same area. (Chart I). For the entire state the open season on these animals is now about 20 days longer than it was during the period between 1867 and 1911. The annual fur harvest in the state indicates that many more muskrats are trapped now by more trappers than at any previous time. It also indicates that the number of muskrats pelted fluctuates from year to year largely in response to economic inducement, favorableness of the trapping season and natural factors not now fully understood.

Explanation for the general increase in the annual muskrat crop during modern times can best be found in a great increase of habitable environment. Impounded water in Ohio which has resulted from flood control, water storage and recreational developments is now more than 1,000 percent greater than at the time of settlement. Muskrats occupy most if not all of these large impounded areas. They have also benefited greatly from the thousands of miles of open drainage ditches in the level agricultural regions of the state. These ditches provide both good sites for muskrats homes and an abundance of superior foods such as corn, soybeans and leguminous forage plants which grow in the nearby crop fields. More than 100 muskrats per mile of drainage ditch have been harvested on an annual basis in some of the more productive areas of the state. Drainage ditches which now exceed natural streams in the state in total length are much more productive of muskrats per unit of area or length than virgin streams that flowed through wooded areas.

Fluctuations in the number of other fur bearers is not so readily explained. There is evidence however that some species, notably beaver and otter became or nearly became extirpated despite early legal action for their protection. It is interesting to note that beaver are becoming reestablished in a number of eastern Ohio counties where considerable land has been retired from agricultural use. These colonies, it should also be noted, probably could not persist without protection from disturbance afforded by local game protectors. The latter thus are able to protect brood stock established through favorable environmental changes.

Migratory wildlife.

Ducks, geese, swans, woodcock, doves and other migratory game birds have been afforded protection during their nesting seasons in Ohio since 1857. (Fig. 3 and Chart I). During this period the restrictions in effect have undergone extreme fluctuations at irregular intervals. It is probable that these changes reflect fluctuations in the supply of waterfowl due to environmental conditions such as recurrent drouths. This is known to be the case during the early 1930's when the North American population of these birds reached an all time recorded low of around 23,000,000 individuals.

Waterfowl and most shore birds are particularly subject to decimation by hunting because of their gregarious behavior during migration and the limited suitable habitat available to them for resting or feeding during this period. It is interesting to note, however, that further restrictions on the waterfowl hunting season in 1946 were made in response to a drop in the duck population that occurred while hunting pressure was at its lowest ebb in recent years due to war conditions. Despite the shortened open season and reduced bag limit the population dropped still farther before 1947, resulting in an open season reduced to but 30 days and a bag limit of 4.

Woodcock are more generally distributed and subject to far less gun pressure during the hunting season than are waterfowl. According to Leedy (7) only 3.6 percent of Ohio hunters pursued this bird during the 1947 season as compared to 9.1 percent who hunted ducks. The population of these birds, however, has apparently continued to decline despite progressively tightened restrictions on

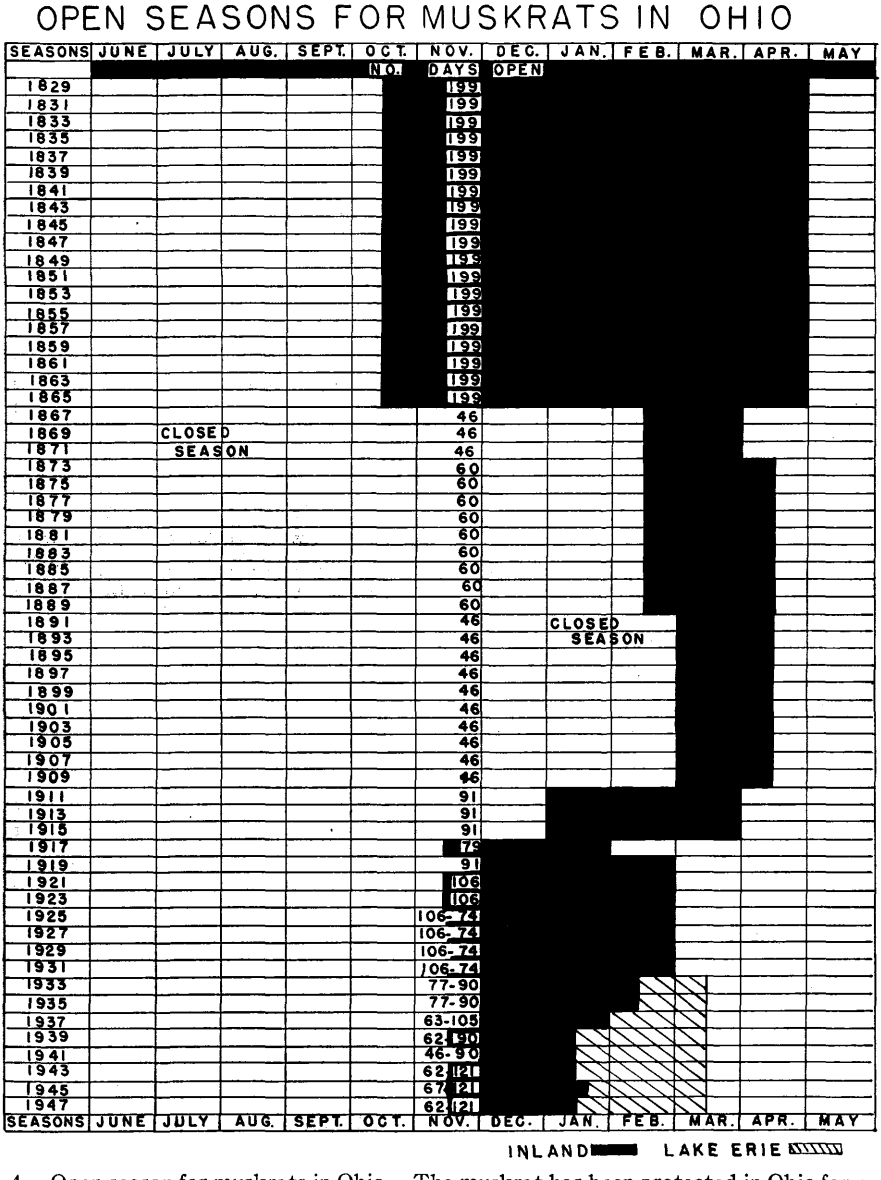

FIG. 4. Open season for muskrats in Ohio. The muskrat has been protected in Ohio for nearly 120 years. We now enjoy a longer trapping season with more pelts being taken annually than was true during the period between 1867 and 1915. This change is probably due to a great increase in habitable muskrat range resulting from improvements for agricultural use of the land such as open drainage ditches and water impoundments for flood control, water storage and recreational purposes.

their use. A similar trend characterizes the population of other shore birds (Chart I). Most of these had reached such low population levels by 1931 that they were then given completely closed seasons. They have not since recovered sufficiently to justify even a very limited open season.

Many words have already been written decrying the wanton slaughter of passenger pigeons in Ohio and elsewhere by market hunters. It is generally believed that such hunting led to their extinction in 1919. It is not so well known, however, that in Ohio at least these birds were protected from market hunting by a law passed in 1876 which made it unlawful to "take or destroy wild pigeons in roosting places, or to discharge firearms within one-half mile of same". This law was further strengthened in 1886 by a measure which forbid "disturbing of pigeons, their eggs or nestlings on their nesting grounds or roostings". Mass slaughter of these birds thus was made illegal more than 25 years before the last record of a bird being killed in the state and more than 40 years before the species passed into oblivion. Restrictions thus may have delayed their final demise but certainly did not prevent it.

The history of most vanishing species in this country reads like a sequel to the story of the passenger pigeon. Nearly all of them were afforded some degree of legal protection when their numbers began to diminish greatly. Fortunately, the extinction of some species has apparently been temporarily, at least, averted (trumpeter swan, whooping crane, ivory billed woodpecker). Those which have recovered have done so under the combined stimulus of protection from hunting and provision of their needed environment.

Recovery of the American elk, the pronghorned antelope, and the colonial nesting birds like the snowy egret, wood ibis, Florida crane and others are stirring examples. It would be well, in the light of these facts, to temper condemnation of the hunter as the decimator of formerly abundant wildlife with the knowledge that much of the wildlife he destroyed could not now survive due to agricultural and industrial progress, except in special preserves or refuges. These facts do not, however, in any manner lessen the importance of hunting restriction enforcement as a tool in perpetuating wildlife species. We need only refer to the recovery of the fur seal industry following the international treaty for their protection in 1911 for evidence that protection from hunting beyond the harvestable surplus is necessary even if other suitable environmental factors are favorable.

Resident Farm Game.

Farm game is probably considerably more abundant in Ohio now than it was 150 years ago. The two principal species in this catagory, at present, cottontail rabbits and ringnecked pheasants, provide millions of hours of recreation and millions of pounds of meat to Ohio hunters annually (9). That cottontails have long been held in high esteem by Ohio hunters is evident from the fact that they were afforded the protection of a fairly long closed season (225 days) as early as 1857 (Fig. 2) and subsequently were favored with special restrictions to enhance their welfare. These included prohibiting the use of ferrets, introduction of a bag limit, and prohibiting the sale of legally taken rabbits.

Changes in length of the open season on Ohio cottontails exhibit a somewhat cyclic pattern (Fig. 2). Whether these changes reflect population variations due to hunting pressure, disease or adverse climatic conditions can only be surmised at the present time. It is evident however that whatever the cause cottontail populations have so improved that we have, in recent years, enjoyed a longer open season on them than was permitted half a century ago. The increase in the length of the open season, it should be noted, came at a time when hunting pressure was rising in response to social changes and has been sustained through at least two decades of intense gun pressure. It may be argued that the lengthened open season was made possible through introduction of a bag limit in 1902. Although this

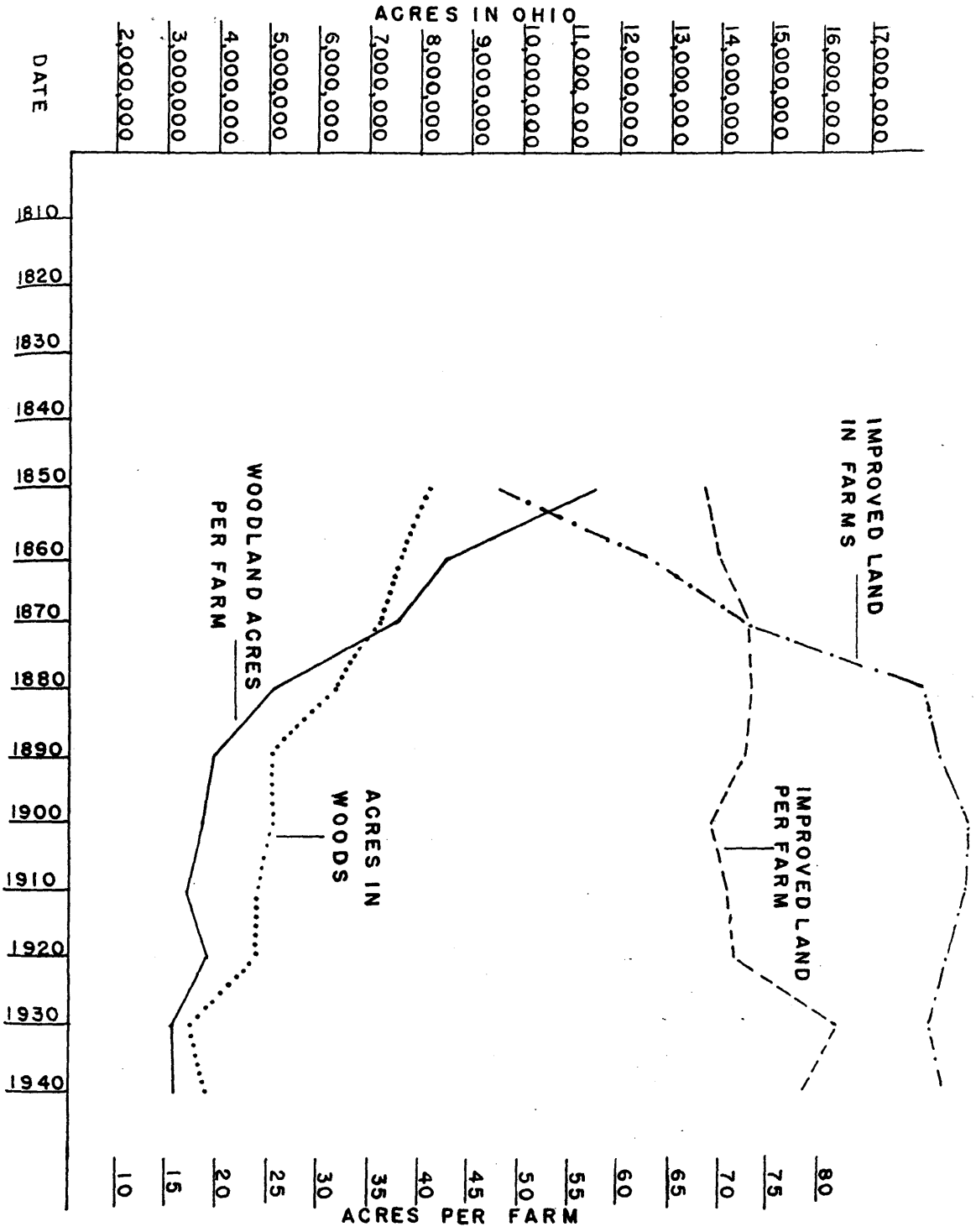

FIG. 5. Changes in Ohio and use.

may be a contributing factor it appears more logical to the writer that the change is due to land use practices such as the growing of forage crops on once forested land.

Ringnecked pheasants, although not introduced successfully into the state until 1896 (5), have also responded well to agricultural use of the land. They too greatly increased in number in the face of rising gun pressure and it is believed for the same reason offered for cottontails.

Our other exotic game bird, the European or popularly called Hungarian partridge has had a less successful history than the pheasant. It has declined in the state to such a low ebb that it has been given complete protection. It is very doubtful however that hunting had much to do with the decline of this bird which is a notoriously difficult target for even the experienced hunter. The European partridge, like the ground nesting cottontail rabbit, ring-necked pheasant and bob-white quail suffered from unfavorable reproductive conditions during the peak nesting period of several recent years.

Of special interest is the fact that the sharp decline of these three species occurred at a time when hunting pressure was at a low ebb with fewer hunters in the field for less time and with less ammunition to expend than usual, due to war conditions. Now that hunting pressure is at an all time high (Fig. 6) the length of the open season has been drastically curtailed to meet the situation. In the meantime we have been favored by a successful breeding season during which both cottontails and pheasants have remarkably recovered to some where near their pre-war abundance. Field studies indicate that the current increase is largely a function of more successful reproduction than occurred during the unfavorable years previously mentioned.

No discussion of farm game in Ohio would be complete without reference to the bob-white quail which has been the subject of a controversy between sportsmen, farmers and nature lovers since it was protected by a closed season and especially since it was made a song bird in 1917. Although the quail, like the cottontail and pheasant, benefitted from early agricultural use of our once forested land it apparently has not been able to hold its own under the more intensive type of agriculture now practiced—particularly in the northwestern part of the state.

Quail have long been protected in this state by favorable closed seasons and special restrictions (Chart I). Their number, nonetheless declined to such an extent that a closed season seemed to be in order before hunting pressure reached the point that a resident hunting license law was put into effect. There is no evidence that quail have responded to this protection. They still experience drastic population slumps in response to unfavorable climatic conditions such as prolonged periods of deep snow cover. The severe winters of 1935–36 and 1944–45 are good examples. Prior to both of these winters Ohio Quail populations had attained fairly stable levels for a number of years. During the severe weather which followed their numbers dropped to a fraction of their average density. It has been observed by this winter that quail populations in Ohio are about the same as those in neighboring states in comparable range and where hunting is permitted. It has also been observed that their populations fluctate to the same degree when similar weather conditions are experienced.

Land use and social changes in relation to wildlife populations.

One of the most obvious social changes affecting wildlife numbers is the change in density and character of the human population. There were less than a million persons in Ohio when the first law protecting a wild animal was passed. At that time 96 percent of the total population lived on farms. Twenty-eight years later, in 1857, the population had more than doubled and at least one of every six persons was living in a city. It was at this time, with a population density of one person per 12 acres in the state that the Legislature took serious cognizance of the welfare

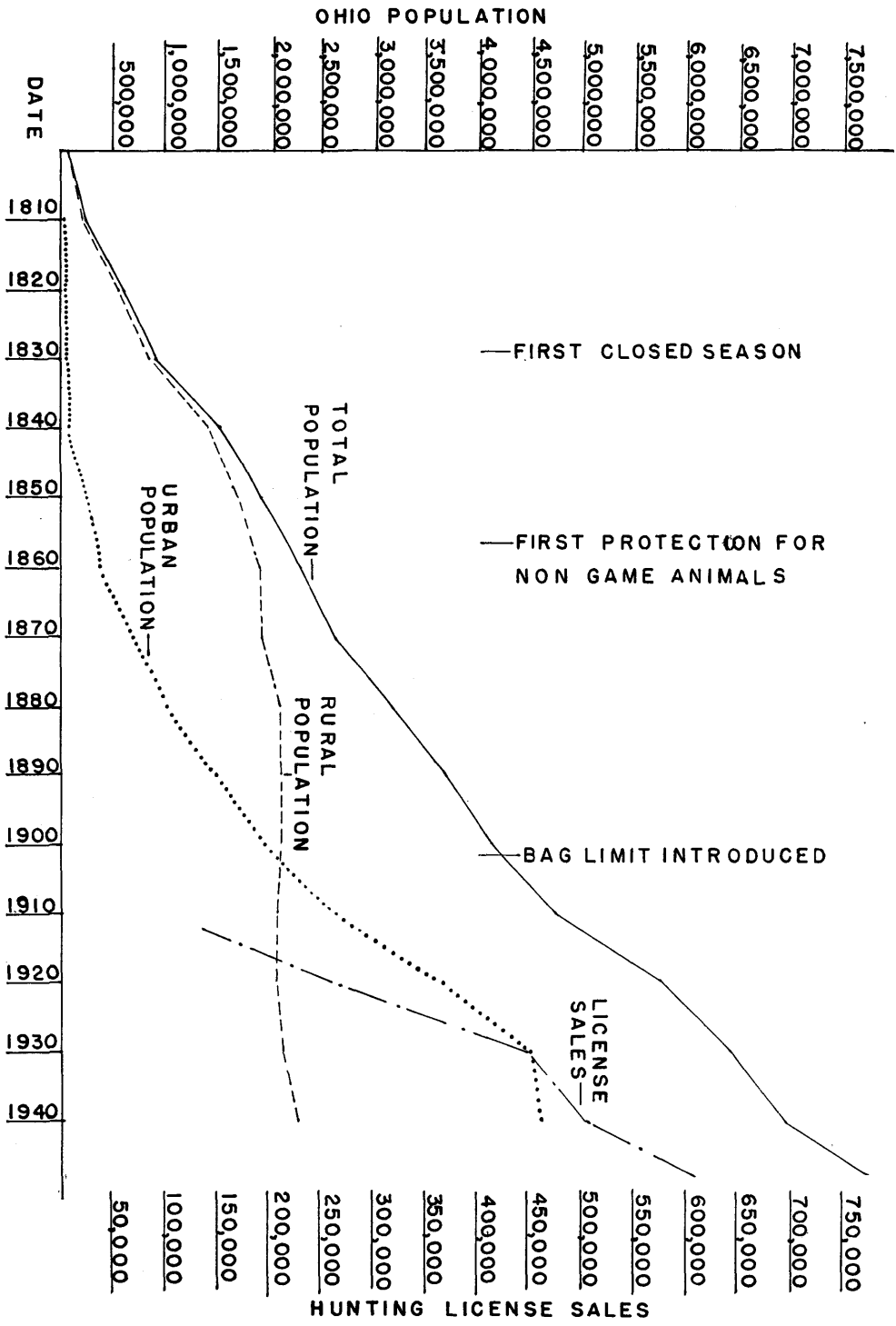

FIG. 6. Ohio population growth, game laws and license sales.

of wildlife and afforded protection to both game and non-game species. Prior to this time there was little inducement for market hunting of wildlife.

The advent of improved transportation facilities following World War I made it possible for many city dwellers to spend an occasional day in the field in pursuit of game thus adding, for the first time, the pressure of city hunters to that exerted by the relatively stable farm population. Growth in the sale of hunting and fishing licenses clearly indicates the rapid trend in this movement. The first resident hunting license law in the state was made effective in 1913. During that year less than 150,000 of the state's nearly 5,000,000 residents, or one in 33, purchased a license to hunt. Hunting license sales since that time have, except for temporary declines due to economic conditions or the recent national emergency, increased at a more rapid rate than population growth. (Fig. 6.)

In recent years hunting license sales have risen to between 600,000 to 700,000 per annum or an average of one license sale per 10 residents or one license per 30 acres of huntable range. These figures do not take into account landowners, farm operators or their children who are permitted to hunt without a license on the land they own or operate. Together these groups probably aggregate nearly a million hunters annually. This represents enormous pressure both on the wildlife and the land that sustains it. Most of this pressure, it should be noted, comes from the urban segment of the population since farm units and farm population have changed little since hunting licenses have been issued. The approximately 250,000 farm units in Ohio today probably sustain three times the hunting population they were subjected to before transportation made it possible for the urban hunter to freely take part in this sport.

Explanation for the rise in the number of persons who seek recreation in the form of hunting may not all be attributed to population growth. Part of it is, of course, due to the desire of men to seek refuge from the complexities of urban life by a few days afield. Opportunity to fulfil this desire has been greatly favored by higher income which has made ownership of transportation facilitites within the means of the average man, shorter working days and short work weeks and the provision of vacations which are part of modern employment practice. Advertising too has surely had an influence on the increasing proportion of our population that hunts or fishes or both. The manufacturers of hunting and fishing equipment have done much to encourage people to participate in these sports through their advertizing in outdoor magazines. This has proved to be a profitable enterprise as these companies and various other businesses profit from the business use of wildlife creates. In Ohio alone expenditures for hunting and fishing have aggregated in excess of $60,000,000 per annum in recent years (9). Even state conservation departments have felt it necessary to advertise their wildlife crop in order to sell more licenses in the interest of securing revenue with which to carry on their work.

We are thus faced with a situation in which social changes are leading to increased hunting pressure without increasing capacity of the land to produce the crop to be harvested. Most of the huntable land in Ohio is in farm ownership where the production of wildlife is at best an incidental and often undesired crop. The public land available for hunting in the state would provide but a fraction of an acre per license holder and is thus of no material consequence, at least at present.

"The ownership of, and title to all wild animals in the State of Ohio, not legally confined or held in private ownership legally acquired,—is in the State, which holds it in trust for the benefit of all the people" (Section 1391, Ohio General Code). Although this law is universally accepted in the United States it has created problems which make the management of wildlife, particularly on private lands, a difficult venture. Under its terms the manufacturer who profits from the sale of hunting equipment may exploit this resource through encouraging hunting with his equipment without doing anything to maintain the resource while the

hunter may use his equipment to harvest game he likewise did nothing to produce. The right of the individual to use wildlife is thus guaranteed but with this right there is no legal responsibility, except obeying game laws, and little moral recognition of responsibility for its welfare. The State on the otherhand is charged with responsibility for the welfare of wildlife but has little opportunity to exercise it because wild life is produced primarily on lands managed for agricultural purposes. It is then, the land owner or farmer who has the opportunity to provide for the welfare of wildlife through his management of the land. Unfortunately there is little incentive for him to do so.

Under these circumstances it is but natural that the states have resorted to managing their wildlife largely by dividing the crop as equitably as feasible through enforcement of game laws. Although these efforts appear to have been fairly effective in dividing the crop it is clear that they have little to do with producing it. This is true of many other activities of conservation departments in which they engage in an effort to find some means of benefitting wildlife with the funds at their disposal. In our own state for example the Conservation Division expended but a little over $600,000 for operations which include wildlife management of the land (of which only a small percent was for private land) as compared to nearly $500,000 for law enforcement, nearly $300,000 for artificial propagation, nearly $150,000 for public relations and nearly $200,000 for administration out of a total budget of $1,779,000 (10). Even had the entire budget been available for activities on private land it would represent an expenditure of but a few cents an acre for this purpose.

CHART 1

CHRONOLOGICAL RECORD OF CHANGES IN HUNTING AND TRAPPING* RESTRICTIONS IN OHIO FOR PRINCIPAL GAME SPECIES

Year	Species	Bag Limit	Open Seasons	Length of Open Seasons
1829	*Muskrat*	.....	Oct. 15–May 1	199 days
1833	*Marten, mink,* muskrat, *otter*—Huron Co.	.....	Dec. 1–April 1	122 days
1840	*Beaver,* marten, mink, muskrat, otter—Lucas and Ottawa Counties.	.....	Feb. 1–April 1	60 days
1845	Sandusky County added to above.	.....	Feb. 1–April 1	60 days
1857	*Dove, flicker, grouse, prairie chicken, quail, turkey, woodcock, deer, rabbit.*	.....	Sept. 15–Feb. 1	140 days
	Geese, duck	.....	Sept. 15–May 1	229 days
	Bluebird, catbird, martin, mocking bird, red bird, robin, sparrow, swallow, thrush		Protected at all times	None
1861	Deer, grouse, prairie chicken, turkey.	.....	Sept. 1–Feb. 1	154 days
	Killdeer, meadow lark, quail	.....	Oct. 1–Feb. 1	124 days
	Geese, duck	.....	Sept. 1–April 15	227 days
	Woodcock	.....	July 4–Feb. 1	213 days
	Bobolink, creeper, cuckoo, finch, ground robin, indigo bird, kingbird, nuthatch, oriole, pewee or *phoebe, warbler, yellowbird*	.....	Protected at all times	None
1864	Deer	.....	Sept. 15–Dec. 1	78 days
1865	Dove, rabbit (except on premise of hunter)	.....	Nov. 1–Feb. 1	93 days
	Grouse, prairie chicken, quail, turkey.	.....	Oct. 15–Feb. 4	113 days
1866	Deer	.....	Oct. 1–Jan. 1	93 days

*Names of birds common to the European countries were included despite the fact that there were no records of their having been recorded here. Probably some of these names were applied in the early days to our native birds.

Italics indicate the first time protection was afforded a species. Only significant changes in length of season and/or bag limit are recorded.

CHART 1—(Continued)

Year	Species	Bag Limits	Open Seasons	Length of Open Seasons
1867	Grouse, quail	.....	Oct. 15–Feb. 1	110 days
	Mink, muskrat, otter	.....	Feb. 15–April 1	46 days
	Flicker, wren	.....	Protected at all times	None
1871	Duck	.....	Sept. 1–Mar. 1	182 days
1873	Deer	.....	Nov. 1–Jan. 1	62 days
	Mink, muskrat, otter (on premises of another)	.....	Feb. 15–April 15	60 days
1874	Deer	.....	Oct. 1–Dec. 1	62 days
	Pheasant or ruffed grouse, prairie chicken or pinnated grouse, *blue-winged teal, mallard* or *wood duck* or any other wild duck, wild goose, or brant	.....	Sept. 1–Jan. 1	123 days
	Quail, turkey	.....	Oct. 15–Jan. 1	79 days
	Rabbits (on premises of another)	.....	Oct. 1–Jan. 1	93 days
	Crossbill or corncrake,* dummock,* Eur. blackbird,* great tit* or *blue tit,* grossbeak, hedge sparrow,* Hungarian robin,* nightingale,** redstart	.....	Protected at all times	None
1875	Deer	.....	Nov. 1–Dec. 1	31 days
1876	Bl.-wg. teal, ruffed grouse	.....	Sept. 1–Jan. 1	123 days
	Deer	.....	Oct. 15–Dec. 1	48 days
	Mallard or wood duck or other wild duck	.....	Sept. 1–April 1	213 days
	Quail, turkey	.....	Nov. 1–Jan. 15	76 days
	Woodcock	.....	July 4–Jan. 1	182 days
1877	Deer	.....	Sept. 20–Nov. 1	43 days
	Quail or prairie chicken	.....	Nov. 1–Jan. 1	62 days
	Swan	.....	Protected at all times	None
	Turkey	.....	Nov. 1–Jan. 15	76 days
1879	Deer	.....	Oct. 20–Nov. 20	31 days
1883	Deer	.....	Oct. 15–Nov. 20	37 days
	Quail, prairie chicken	.....	Nov. 1–Dec. 1	31 days
1885	Quail	.....	Closed in Fulton Co. for 5 years.	None
	Mallard or wood duck	.....	Sept. 1–April 1	213 days
	Other wild duck	.....	Sept. 15–April 15	213 days
	Gray or *fox squirrel*	.....	June 1–Feb. 1	246 days
1886	Mallard, wood and other ducks	.....	Sept. 1–April 10	225 days
	Quail or prairie chicken	.....	Nov. 10–Jan. 1	53 days
	Rabbit	.....	Oct. 1–Feb. 1	124 days
	Squirrel	.....	June 1–Jan. 1	214 days
	Turtle dove	.....	Aug. 1–Jan. 1	153 days
1888	Prairie chicken, ruffed grouse, any wild duck	.....	Sept. 1–Dec. 15	106 days
	Quail	.....	Nov. 10–Dec. 15	36 days
	Squirrel	.....	June 1–Dec. 15	198 days
	Turkey	.....	Oct. 1–Dec. 15	76 days
	Woodcock	.....	July 15–Nov. 1	110 days
1890	Any wild duck	.....	Sept. 1–April 10	222 days
	Deer	.....	Oct. 15–Dec. 15	62 days
	Gray, fox or black squirrel	.....	July 1–Dec. 15	168 days
	Mink, muskrat, otter	.....	Mar. 1–April 15	46 days
1896	Deer, *ringnecked pheasant*	.....	Closed to 1900	None
	Dove, rabbit, squirrel	.....	Sept. 1–Dec. 15	106 days
	Rail	.....	Sept. 1–April 10	222 days
	Ruffed grouse, turkey	.....	Nov. 10–Dec. 15	36 days
	Woodcock	.....	July 4–Nov. 15	135 days
1898	Duck	.....	Sept. 1–April 15	227 days
1900	Coot, duck, rail	.....	Nov. 10–Dec. 1	22 days|54
			Mar. 10–April 10	32 days|days
	Deer	.....	Nov. 10–Dec. 16	37 days
	Prairie chicken, quail, rabbit, ruffed grouse, squirrel, woodcock	.....	Nov. 10–Dec. 1	22 days

CHART 1—(Continued)

Year	Species	Bag Limits	Open Seasons	Length of Open Seasons
1902	Pheasant, prairie chicken, ruffed grouse	*6*	Protected to Nov. 10, 1904; subsequently to 1917	None
	Rail		Nov. 10–Dec. 1 Mar. 10–April 20	22 days | 64 42 days | days
	Skunk		Nov. 1–Feb. 1	93 days
	Squirrel	*10*	Aug. 1–Sept. 1	32 days
	Turkey		Nov. 10–Dec. 1	22 days
	Woodcock	*18*	Aug. 1–Sept. 1	32 days
1904	Duck	*25*	Sept. 15–Dec. 1 Mar. 1–April 20	78 days | 129 51 days | days
	Geese, rail	*18*	Sept. 1–Dec. 1 Mar. 1–April 1	92 days | 124 32 days | days
	Quail	*18*	Nov. 15–Dec. 15	32 days
	Rabbit		Nov. 15–Dec. 5	21 days
	Raccoon		Sept. 1–Mar. 1	182 days
	Squirrel	10	Sept. 15–Oct. 15	45 days
	Woodcock, dove	18	Sept. 1–Dec. 1	92 days
1906	Ducks	25	Sept. 1–Dec. 1 Mar. 1–April 20	92 days | 143 51 days | days
	Quail	18	Nov. 15–Dec. 5	21 days
	Rail	18	Sept. 1–Dec. 1 Mar. 1–April 20	92 days | 143 51 days | days
1908	Dove		Sept. 1–Dec. 4	95 days
	Ducks	25	Sept. 1–Dec. 31 Mar. 1–April 20	122 days | 173 51 days | days
	Quail	18	Nov. 15–Dec. 4	20 days
	Rabbit		Nov. 15–Dec. 4	20 days
	Raccoon		Nov. 1–Mar. 1	121 days
	Squirrel	10	Oct. 1–Oct. 30	30 days
1910	Rail	18	Sept. 1–Dec. 31 Mar. 1–April 20	122 days | 173 51 days | days
	Woodcock	12	Sept. 1–Dec. 4	95 days
1911	Deer, otter, prairie chicken, wild turkey		Reported extinct in Ohio.	
	Fox		Sept. 1–Dec. 1	92 days
	Muskrat		Jan. 1–April 1	91 days
	Quail	12	Nov. 15–Dec. 4	21 days
	Raccoon		Nov. 1–Mar. 1	121 days
	Squirrel	5	Sept. 15–Oct. 20	36 days
1913	Doves, quail, Hungarian partridge		Protected to 1915, then to 1917	None
	Ducks and geese	25	Sept. 1–Dec. 1 Mar. 1–April 20	92 days | 143 51 days | days
	Fox		Oct. 1–Jan. 10	102 days
	Rail	12	Sept. 1–Dec. 1	92 days
	Skunk		Nov. 15–Feb. 1	79 days
1915	Duck	25	Sept. 1–Dec. 15 Mar. 1–April 20	106 days | 157 51 days | days
	Fox		Oct. 2–Jan. 9	100 days
	Rabbit		Nov. 1–Jan. 1	62 days
	Rail	12	Sept. 1–Nov. 30	91 days
	Woodcock	12	Oct. 1–Nov. 30	61 days
1917	*Blackbird, bluejay, bobolink, buzzard, dove, eagle, gull, killdeer, mouse-hawk, nuthatch, quail, sparrow and other wild birds* other than game birds		Made songbirds, protected at all times.	None
	Ducks	25	Sept. 16–Dec. 15 Mar. 1–April 20	91 days | 142 51 days | days

CHART 1—(Continued)

Year	Species	Bag Limits	Open Seasons	Length of Open Seasons
1917	Hungarian partridge, rinknecked pheasant, ruffed grouse	.....	Nov. 15–Dec. 4	20 days
	Mink, muskrat, opossum, raccoon	.....	Nov. 15–Feb. 1	79 days
	Rabbit	*10*	Nov. 15–Jan. 1	48 days
1919	Ducks	25	Sept. 16–Dec. 31	107 days
	Fox	.....	Oct. 2–Jan. 1	92 days
	Hungarian partridge	6	Nov. 15–Nov. 25	11 days
	Mink, opossum, raccoon, skunk	.....	Nov. 1–Feb. 1	93 days
	Muskrat	.....	Dec. 1–Mar. 1	91 days
	Rail	25 (Sora 35)	Nov. 1–Dec. 31	61 days
	Ringnecked pheasant	3 cockbirds	Nov. 15–Nov. 25	11 days
	Ruffed grouse	3	Nov. 15–Nov. 25	11 days
	Woodcock	*6*	Oct. 1–Nov. 30	61 days
1921	Fox, opossum, skunk	.....	Nov. 15–Feb. 1	79 days
	Mink, muskrat	.....	Nov. 15–Mar. 1	107 days
1923	Raccoon	.....	Nov. 15–Feb. 1	79 days
1925	Muskrat	.....	Inland, Nov. 15–Mar. 1	107 days
			Lake Erie, Dec. 1–Mar. 15	105 days
1927	Rabbit	5	Nov. 15–Jan. 1	48 days
	Ruffed grouse, squirrel	.....	Protected at all times	None
1928	Squirrel	4	Oct. 1–Oct. 15	15 days
	Yellowlegs	.....	Protected at all times	None
1929	Fox	.....	Nov. 15–Jan. 1	48 days
	Squirrel	4	Sept. 15—Oct. 1	16 days
	Woodcock	4	Oct. 15–Nov. 14	31 days
1930	Rail	25 (Sora 25)	Nov. 1–Nov. 30	30 days
1931	Ducks	15	Oct. 16–Nov. 15	31 days
	Hungarian partridge	4	Nov. 15–Nov. 25	11 days
	Plover (black-bellied and golden)	.....	Protected at all times	None
	Raccoon	.....	Nov. 15–Jan. 15	62 days
1932	Ducks	15	Oct. 16–Dec. 15	61 days
	Mink	.....	Inland, Dec. 1–Feb. 15	77 days
			Lake Erie, Dec. 1–Mar. 1	91 days
	Muskrat	.....	Inland, Dec. 1–Feb. 15	77 days
			Lake Erie, Dec. 15–Mar. 15	91 days
1934	Ducks	12	Oct. 4–Dec. 8	66 days
1935	Ducks	10	Oct. 21–Nov. 19	30 days
	Fox	.....	Nov. 15–Feb. 1	79 days Southern counties, open elsewhere
	Mink	.....	Inland, Dec. 1–Feb. 1	63 days
			Lake Erie, closed	None
	Rail	15 (Sora 25)	Nov. 1–Nov. 19	19 days
1936	Ducks	10	Nov. 1–Nov. 30	30 days
	Mink	.....	Lake Erie, Dec. 15–Mar. 1	77 days
	Muskrat	.....	Inland, Dec. 1–Feb. 1	63 days
	Rail	15 (Sora 25)	Sept. 1–Nov. 30	92 days

CHART 1—(Continued)

Year	Species	Bag Limits	Open Seasons	Length of Open Seasons
	Ringnecked pheasant	2 cocks 4 possession	Nov. 15–Nov. 26	12 days
	Squirrel	4	Oct. 1–Oct. 15	15 days
	Woodchuck	.....	Protected, March 1 to June 30	
1937	Ducks	10	Oct. 9–Nov. 7	30 days
	Mink	.....	Lake Erie, Dec. 15–Feb. 1	49 days
	Opossum, skunk	.....	Nov. 15–Jan. 15	62 days
	Squirrel	.....	Sept. 25–Oct. 10	16 days
1938	Hungarian partridge	4	Nov. 15–Nov. 30	16 days
	Mink, muskrat	.....	Inland, Nov. 15–Jan. 15	62 days
			Lake Erie, Dec. 15–Mar. 15	91 days
	Rabbit	4	Nov. 15–Jan. 2	49 days
	Ringnecked pheasant	2	Nov. 15–Nov. 25	11 days
	Ruffed grouse	2	Nov. 15–Nov. 30	16 days
	Squirrel	4	Oct. 1–Oct. 15	15 days
1939	Ducks	10	Oct. 22–Dec. 5	45 days
	Fox	.....	Nov. 15–Jan. 15	62 days
	Hungarian partridge	4	Nov. 8–Nov. 30	23 days
	Rabbit	4	Nov. 8–Jan. 1	55 days
	Raccoon	*6*	Nov. 15–Jan. 1	48 days
	Ringnecked pheasant, ruffed grouse	2	Nov. 8–Nov. 30	23 days
	Squirrel	4	Sept. 25–Oct. 10	16 days
1940	Hungarian partridge	4	Nov. 15–Nov. 30	16 days
	Ringnecked pheasant, ruffed grouse	2	Nov. 15–Nov. 30	16 days
1941	Ducks	10	Oct. 16–Dec. 4	50 days
	Fox	.....	Nov. 15–Feb. 1	79 days
	Mink, skunk	.....	Dec. 1–Jan. 15	46 days
	Muskrat	.....	Inland, Dec. 1–Jan. 15	46 days
			Lake Erie, Dec. 15–Mar. 15	91 days
	Raccoon	6	Nov. 15–Jan. 15	62 days
	Squirrel	4	Sept. 15–Sept. 30	16 days—southern
			Sept. 22–Sept. 30	9 days—northern
	Woodcock	4	Oct. 10–Oct. 24	15 days
1942	Fox	.....	Nov. 20–Feb. 1	74 days
	Hungarian partridge	4	Nov. 20–Dec. 5	16 days
	Ringnecked pheasant, ruffed grouse	2	Nov. 20–Dec. 5	16 days
	Muskrat	.....	Inland, Nov. 20–Jan. 15	57 days
			Lake Erie, Nov. 20–Mar. 15	116 days
	Rabbit	4	Nov. 20–Jan. 5	47 days
1943	Deer (Restricted to Scioto, Adams and Pike Counties)	1 buck	Dec. 6–Dec. 18	13 days
	Ducks	10	Sept. 25–Dec. 3	70 days
	Hungarian partridge	4	Nov. 19–Dec. 4	16 days
	Mink, muskrat	.....	Inland, Nov. 15–Jan. 15	62 days
			Lake Erie, Nov. 15–Mar. 15	121 days
	Rabbits	4	Nov. 19–Jan. 11	54 days
	Ringnecked pheasant, ruffed grouse	2	Nov. 19–Dec. 4	16 days
	Skunk	.....	Nov. 20–Mar. 15	116 days
	Wilson's snipe	.....	Protected at all times	None

CHART 1—(Continued)

Year	Species	Bag Limits	Open Seasons	Length of Open Seasons
1944	Deer	1 buck	Dec. 4–Dec. 9	6 days
	(Restricted to Scioto, Adams and Pike Counties)			
	Ducks	10	Sept.20–Dec. 8	80 days
	(Bag limit also 5 mallards, pintails, widgeons, single or in the aggregate)			
	Hungarian partridge	4	Nov.17–Dec. 2	16 days
	Mink, muskrat	.....	Inland,	
			Nov.17–Jan. 20	65 days
			Lake Erie,	
			Nov.17–Mar. 1	105 days
	Opossum, skunk	.....	Nov.17–Jan. 20	65 days
	Rabbit	4	Nov.17–Jan. 13	58 days
	Raccoon	2	Nov.17–Jan. 20	65 days
	Red fox (in 14 S. E. Ohio Counties)..	.....	Nov.17–Jan. 13	58 days
	Elsewhere open at all times.			
	Ringnecked pheasant, ruffed grouse..	2	Nov.17–Dec. 2	16 days
1945	Coot, merganser	25	Sept.20–Dec. 8	80 days
	Deer	1 buck	Dec. 3–Dec. 8	6 days
	Ducks	10	Sept.20–Dec. 8	80 days
	Geese	4	Sept.20–Dec. 8	80 days
	Hungarian partridge, pheasant, rabbit	.....	Closed until 11 A. M. opening day	
	Mink, muskrat	.....	Inland,	
			Nov.15–Jan. 20	67 days
			Lake Erie,	
			Nov.15–Mar. 15	121 days
	Opossum, raccoon, skunk	.....	Nov.15–Jan. 20	67 days
	Rails	15 (Sora 25)	Sept. 1–Nov.30	91 days
	Woodcock	.....	Oct. 10–Oct. 24	15 days
1946	Deer	.....	Protected	None
	Ducks	7	Oct. 26–Dec. 9	45 days
	Geese	2	Oct. 26–Dec. 9	45 days
	Hungarian partridge	2	Nov.15–Nov.30	16 days
	Mink, muskrat	.....	Inland,	
			Nov.15–Jan. 15	62 days
			Lake Erie,	
			Nov.15–Mar. 15	121 days
	Opossum	.....	Nov.15–Jan. 15	62 days
	Rabbit	4	Nov.15–Jan. 1	48 days
	Raccoon	2	Nov.15–Jan. 15	62 days
	Skunk	.....	Nov.15–Jan. 15	62 days
			Except in 13 S. E. Counties	None
	Squirrel	4	Sept.14–Sept.28	15 days
1947	Coot, merganser	25	Oct. 21–Nov.19	30 days
	Deer (in 8 N. E. Counties)	1	Dec. 15–Dec. 20	6 days
	Ducks, geese	4	Oct. 21–Nov.19	30 days
	Hungarian partridge, skunk	.....	Protected	None
	Pheasant	2	Nov.15–Nov.22	8 days
	Rabbit	4	Nov.15–Dec. 13	29 days
	Squirrel	4	Sept.13–Sept.27	15 days

DISCUSSION AND SUMMARY

Emphasis in this paper has been placed on the apparent natural decline and rise of certain game populations in the state in relation to the enforcement of hunting restrictions and land use and social changes. It has not been the writer's intent

to minimize the importance of hunting restrictions but rather to point out their limitations in accomplishing the objectives for which they have been employed; namely perpetuation and increase of the species protected and sharing of the crop. The writer is convinced that regulations are necessary to assure an orderly and fairly distributed harvest of the wildlife crop but that their use should be tempered with recognition of their limitations of which the following are important examples:

1. Enforcement of hunting restrictions even to the extent of completely closed seasons has not been effective in halting the decline of wildlife suffering from habitat depletion. Most if not all wildlife declines in Ohio have been of this type. The history of deer, grouse, squirrels and wild turkey are examples.
2. The chief values of hunting restrictions appear to be:
   a. Preservation of brood stock. This is an assumed value as there is no clear evidence that hunting according to present custom is an effective means of reducing populations below their capacity to recover quickly *under favorable environmental conditions.* This is particularly true of species with a high biotic potential and the ability to seek refuge when pursued by the hunter. The cottontail rabbit in a brushy pasture is a good example. Unrestricted hunting might produce different results although the effect of diminishing returns from declining populations should tend to keep hunters out of the field.
   b. An equitable distribution of the supply of naturally produced wildlife. Limited open seasons and bag limits assure somewhat equal opportunity for the majority of hunters to be in the field at the same time in competition for the available crop.
3. The chief factor determining long time trends in game populations in Ohio is land use. Only in so far as the major use of the land can be modified to meet the needs of wildlife can any appreciable influence on game populations be expressed. Hunting restrictions, artificial propagation, predator control, winter feeding and related efforts are incidental compared to natural production. The land operator whether he be managing public or private land determines the use to which it is put. His use of the land can be modified to benefit wildlife if suitable incentives are provided. We do not at present seem to have any substantial means of providing these incentives.

LITERATURE CITED

(1) **Census Report.** 1935. Census of the United States, Census of Agriculture. V. 3, U. S. Govt. Print. Office.
(2) **Census Report.** 1940. Census of the United States. V. 1, 83.
(3) **Finfrock, C. M.** 1939. History of Conservation Legislation in Ohio. MS. (Oberlin College Library).
(4) **Finfrock, C. M.** 1944. Personal correspondence, 10–27–44.
(5) **Hicks, L. E.** 1935. Distribution of the Breeding Birds of Ohio. Ohio Biol. Survey, Bull. 32, VI(3): 1–190.
(6) **Langlois, T. H.** 1944. The Role of Legal Restrictions in Fish Management. Trans. Ninth N. Amer. Wildlife Conf., 192–202, 336.
(7) **Leedy, D. L.** 1947. Some Observations on Hunting, Wildlife Economics and the Game Kill. Ohio Cons. Bull. 11(7): 4–7.
(8) **Leedy, D. L.** 1948. Some Wildlife and Land Use Relationships in Ohio. Ohio Jr. Sc., 48(4): 151–160.
(9) **Leedy, D. L.,** and **Charles A. Dambach.** 1948. An Evaluation of Ohio's Wildlife Resources. Wildlife Cons. Bull. 5, Ohio Div. of Cons. and Nat. Res., 1–16.
(10) **Rider, H. A.** 1948. Annual Report of Ohio Division of Conservation for the Calendar Year 1947. State of Ohio, Div. of Cons., 1–53.
(11) **Sears, P. B.** 1942. History of Conservation in Ohio. Reprinted from History of Ohio in the Twentieth Century. The Ohio State Archaeological and Historical Society, 219–240.
(12) **Wickliff, E. L.** 1939. Fish and Game Laws in Ohio, 1890–1930. Mimeo.